IN THE CLAIMS

1. (CURRRENTLY AMENDED) A tunable laser comprising:

a waveguide for guiding a light beam, the waveguide including a separate-confinement-heterostructure (SCH) having an energy bandgap that is sufficiently low to provide gain to the light beam;

a front mirror defining an end of a cavity within the waveguide;

a back mirror defining an opposite end of the cavity within the waveguide;

the cavity within the waveguide including:

a gain section within the cavity for providing spontaneous emission of the light beam and for providing gain for the light beam, wherein the quantum well bandgap is lower than ~~elsewhere~~ the SCH in the gain section; and

a phase section within the cavity for tuning the light beam around a center frequency of a bandwidth;

wherein reflectivities of the front mirror and the back mirror and the center frequency of the phase section are tuned to be substantially coincident such that the light beam exits the cavity and wherein additional gain for the light beam is provided by at least one of the phase section, the front mirror and the back mirror in order to partially compensate for losses associated with tuning.

2. (PREVIOUSLY PRESENTED) The laser of claim 1, wherein the gain provided by at least one of the phase section, the front mirror and the back mirror has a saturation power higher than substantially 5 mW.

3. (PREVIOUSLY PRESENTED) The laser of claim 1, wherein the waveguide including the SCH is uniform across the gain section and the phase section and the front mirror and the back mirror.

4. (ORIGINAL) The laser of claim 3, wherein the SCH includes centered shallow quantum wells.

5. (ORIGINAL) The laser of claim 3, wherein the SCH is optimized such that the gain builds up rapidly to a level substantially equal to that required for a device threshold.

6. (ORIGINAL) The laser of claim 3, wherein each of the gain and phase sections and front and back mirrors has an index that is separately adjusted by biases separately altered at each.

7. (ORIGINAL) The laser of claim 6, wherein the indexes are adjusted while a net gain remains at a device threshold.

8. (PREVIOUSLY PRESENTED) The laser of claim 3, wherein free-carrier absorption loss resulting from a build up of carriers in the SCH is at least partially compensated for by the gain provided by the at least one of the phase section, the front mirror and the back mirror.

9. (PREVIOUSLY PRESENTED) The laser of claim 1, wherein the gain provided by the at least one of the phase section, the front mirror and the back mirror is modified by a process selected from selective quantum well intermixing, selective area growth and butt-joint regrowth of waveguides of different bandgaps.

10. (ORIGINAL) The laser of claim 1, wherein gain is provided by more than one of the group comprising the phase section, the front mirror and the back mirror and each gain is separately modified by a process selected from the group comprising selective quantum well intermixing, selective area growth and butt-joint regrowth of waveguides of different bandgaps.

11. (ORIGINAL) The laser of claim 10, wherein gain is provided by the front mirror modified by selective quantum well intermixing and gain is provided by the back mirror modified by selective quantum well intermixing wherein each intermixing produces different bandgap regions.

12. (ORIGINAL) The laser of claim 10, wherein the gain section has relatively low quantum well and high SCH bandgaps.

13. (ORIGINAL) The laser of claim 1, wherein the gain provided by at least one of the group comprising the phase section, the front mirror and the back mirror is applied through an electrical contact interlaced with a tuning electrical contact.

14. - 26. (CANCELLED)

27. (CURRENTLY AMENDED) An article of manufacture comprising a sampled-grating distributed Bragg reflector (SGDBR) laser, the SGDBR laser comprising:

a waveguide for guiding a light beam, the waveguide including a separate-confinement-heterostructure (SCH) having an energy bandgap that is sufficiently low to provide gain to the light beam;

a front mirror defining an end of a cavity within the waveguide;

a back mirror defining an opposite end of the cavity within the waveguide;

the cavity within the waveguide including:

a gain section within the cavity for providing spontaneous emission of a light beam and for providing gain for the light beam, wherein the quantum well bandgap is lower than ~~elsewhere~~ the SCH in the gain section; and

a phase section within the cavity for tuning the light beam around a center frequency of the bandwidth;

wherein reflectivities of the front mirror, the back mirror and the center frequency of the phase section are tuned to be substantially coincident such that the light beam exits the cavity and wherein additional gain for the light beam is provided by at least one of the phase section, the front mirror and the back mirror in order to partially compensate for losses associated with tuning.

28. (PREVIOUSLY PRESENTED) The article of claim 27, wherein the gain provided by at least one of the phase section, the front mirror and the back mirror has a saturation power higher than substantially 5 mW.

29. (PREVIOUSLY PRESENTED) The article of claim 27, wherein the waveguide including the SCH is uniform across the gain section and the phase section and the front mirror and the back mirror.

30. (ORIGINAL) The article of claim 29, wherein the SCH includes centered shallow quantum wells.

31. (ORIGINAL) The article of claim 29, wherein the SCH is optimized such that the gain builds up rapidly to a level substantially equal to that required for a device threshold.

32. (ORIGINAL) The article of claim 29, wherein each of the gain and phase sections and front and back mirrors has an index that is separately adjusted by biases separately altered at each.

33. (ORIGINAL) The article of claim 32, wherein the indexes are adjusted while a net gain remains at a device threshold.

34. (PREVIOUSLY PRESENTED) The article of claim 29, wherein free-carrier absorption loss resulting from a build up of carriers in the SCH is at least partially compensated for by the gain provided by at least one of the phase section, the front mirror and the back mirror.

35. (PREVIOUSLY PRESENTED) The article of claim 27, wherein the gain provided by the at least one of the phase section, the front mirror and the back mirror is modified by a process selected from selective quantum well intermixing, selective area growth and butt-joint regrowth of waveguides of different bandgaps.

36. (ORIGINAL) The article of claim 27, wherein gain is provided by more than one of the group comprising the phase section, the front mirror and the back mirror and each gain is separately modified by a process selected from the group comprising selective quantum well intermixing, selective area growth and butt-joint regrowth of waveguides of different bandgaps.

37. (ORIGINAL) The article of claim 36, wherein gain is provided by the front mirror modified by selective quantum well intermixing and gain is provided by the back mirror modified by selective quantum well intermixing wherein each intermixing produces different bandgap regions.

38. (ORIGINAL) The article of claim 36, wherein the gain section has relatively low quantum well and high SCH bandgaps.

39. (ORIGINAL) The article of claim 27, wherein the gain provided by at least one of the group comprising the phase section, the front mirror and the back mirror is applied through an electrical contact interlaced with a tuning electrical contact.

40. (PREVIOUSLY ADDED) The laser of claim 1, wherein the gain section has relatively low quantum well and high SCH bandgaps.

41. (PREVIOUSLY ADDED) The article of claim 27, wherein the gain section has relatively low quantum well and high SCH bandgaps.